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South of this drier section the surface dips for about two-thirds the length, forming a narrow trough of sandy bog, covered with a various growth, including *Pinus rigida* and Vacciniaceae, offering continuous shade. Here is the habitat of *Cephalozia Francisci* growing mostly on small plots of barren sands, forming beautiful dark-green mats from a few inches to ten feet in diameter. In one spot where a slight gully transverses the depression, the plant follows the shady western edge for fifty feet.

Growing contiguously and abundantly is *Cephalozia macrostachya* and more rarely *C. fluitans*. *Riccardia pinguis* and *Fossombronia foveolata* occupy more rush-grown localities in the region.

The Musci are meagrely represented by *Leucobryum glaucum*, *Sphagnum inundatum* and *S. subsecundum*.

ORIENT, NEW YORK

NOTE ON BUXBAUMIA INDUSIATA BRIDEL

RALPH S. NANZ

Dr. Grout's note in the May number of THE BRYOLOGIST indicates the wide range of *Buxbaumia indusiata* Brid., in spite of its rarity. This species of *Buxbaumia* has been found twice within the past year in the vicinity of Ithaca, N. Y. On September 7, 1916, Dr. Andrews and I found the moss on a decayed stump, probably hemlock, in a very moist woods near the McLean bogs, about fifteen miles northeast of Ithaca. The capsules, four in number, were immature and green in color. On April 9, 1917, Prof. K. M. Wiegand and Mr. F. B. Wann discovered it in Coy Glen Ravine, two miles south of Ithaca. Ten mature capsules were found on a log, growing together with *Lophocolea heterophylla* (Schrad.) Dum. The specimens collected agree in appearance with Dr. Grout's photographs. The mature capsules are light brown in color, in contrast to the deep red brown of *B. aphylla*. The two very opposite types of situation are worth noting; in the one case a swampy woods, and in the other a rocky ravine.

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MISCELLANEOUS NOTES

A Record to be Envied.—Under date of January 29, 1917, Dr. John Macoun writes from Sidney, B. C., as follows:

"I take quite an interset in the BRYOLOGIST and am still collecting. Think of it! I sent my first mosses to Sullivant in 1861. The first new species I found was *Leptodon nitidus*, named by him from my specimens.

"Since then I have found nearly one thousand of all kinds, from trees to seaweeds, and I am at it yet."

Four-lobed spore mother cells in Catharinaea.—Most students of the mosses, hepatics, and lichens are interested primarily in the collection and identification of the various species of these plants, or in studying their distribution and general life-habits. A limited number of botanists have confined their studies, or at least have devoted much time, to the investigation of the microscopic internal structure of these plants (anatomy), the more minute structure of the cells themselves (cytology), or the study of the embryo (embryology). A recent contribution by Allen[1] in the *American Journal of Botany* relates to the four-lobed form taken by the cells in the capsule of Catharinaea. It will be recalled by our readers that the cells in the capsules of the mosses and hepatics which give rise directly to spores are termed "spore mother cells," and that such cells always normally give rise to four spores often termed tetraspores. The formation of tetraspores has been for a long time a subject of great interest in that certain structures in the nucleus of the cells of the capsule, and indeed of the whole sporophyte, known as chromosomes, are twice as many in each nucleus as in the nuclei of the gametophyte. The number of these chromosomes is doubled whenever the egg-cell is fertilized by the sperm and the number is not again reduced until the four tetraspores are formed in the spore mother cells of the capsule. This division of the material in the spore mother cells to form tetraspores is for this reason known as the "reduction division."

Allen reports that from living immature capsules of Catharinaea collected in southern Wisconsin in August, 1915, he pressed out the spore mother cells and found them to be strongly four-lobed. This lobing is, as he notes, almost universal in the Jungermanniales but further notes: "That is, I think, the first observed case of the occurrence of four-lobed spore mother cells in a bryophyte not a member of the Jungermanniales. It remains to be seen to what extent this character appears among the Bryales." Here is a good chance for our readers to contribute something new to science. When you find nearly mature capsules press out the contents and examine under the microscope, then record carefully the results and contribute your notes to the BRYOLOGIST.

Another interesting point noted by Allen was that there is a plastid in each lobe of the spore mother cell and that the early division of a single plastid into four has been known for some time to occur in Anthoceros,[2] and also, to judge from the work of Sapehin[3] and Melin,[4] it is of common occurrence among the Musci.

Allen reports that "There are rather striking differences in size between the spore mother cells of plants collected in different localities, although the mother cells borne in a single capsule differ little in size, and, so far as my observations have gone, there is no great variation in this respect as between different plants growing in the same clump. Along with these differences in size of the spore mother cells between plants of different localities go other well-marked differences in such characters as size of plant, size of leaf, number of lamellae on the upper surfaces of the leaves, and number of spines on the lower surfaces. While doubtless some of these characters are influenced by external conditions, it seems not unlikely that the plants in question may represent distinct races, all of which, however, seem to fall within the limits of *C. angustata* Brid., as at present defined; although since this species intergrades with *C. undulata* Web. & Mohr, it is possible that some of the forms observed should be referred to the latter species."

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[1] Allen, Charles E. Four-lobed Spore Mother Cells in Catharinea. Amer. Journ. Botany **3:** 456–460. Oct., 1916.

[2] Davis, B. M. The Spore-mother-cell of Anthoceros. Bot. Gaz. **28:** 89–109. 1899.

[3] Sapehin, A. A. Ueber das Verhalten der Plastiden im sporogenen Gewebe. Bericht. Deutsch Bot. Ges. **29:** 491–496. 1911.

[4] Melin, E. Die Sporogenese von *Sphagnum squarrosum* Pers. Nebst einigen Bemerkungen über das Antheridium von *Sphagnum acutifolium* Ehrh. Svensk Bot. Tidsk. **9:** 261–293. 1915.

O. E. J.

Hermann Edward Hasse—Lichenist.—Dr. Bruce Fink[5] has contributed to the September, 1916, number of *Mycologia* an excellent brief account of the life and botanical activities of our late lamented Curator of Lichens. Dr. Fink speaks of him as "the man who has added, it seems, the largest number of lichens to our North American flora, through his own collecting, since the days of Tuckerman." About twenty-five years of his collecting in southern California added about seventy-five new species, the earlier ones being named mainly by Stizenberger, Nylander, or Zahlbruckner, the later ones mainly by Hasse himself. Fink notes that Mr. John I. Kane presented to the New York Botanical Garden, in 1906, about 3000 species and many duplicates from Hasse's herbarium. Recently a large collection of lichens was purchased from Mrs. Hasse for the Cryptogamic Herbarium at Harvard University, this collection probably comprising the specimens used in the preparation of Hasse's *Lichen Flora of Southern California.* Our readers will recall also that our present Curator of Lichens, Mr. Plitt, is busily working over a large collection of duplicates from the lichen herbarium given to the Sullivant Moss Society by Mrs. Hasse and numbering several thousands of specimens, and that sets of these lichens from the Lichen Herbarium of the Society are now being issued to subscribers. Dr. Fink's article includes a list of thirty-two published papers on lichens written by Dr. Hasse. This biography and the one written by Plitt,[6] for the BRYOLOGIST together constitute a valuable record of the life and work of one of America's foremost lichenists.

O. E. J.

The Vegetation of Connecticut.—In a former number of the BRYOLOGIST[7] attention has been called to numbers I–IV of Nichols's "The Vegetation of Connecticut." Number V is entitled "Plant Societies along Rivers and Streams"[8] and the author considers in considerable detail the changes in vegetation that occur as a valley passes through the stages from youth to old age.

The Rock Ravine is first considered and, under the heading of "The Bryophytic Flora of Rock Ravines" lists are given:

(*a*) The hydrophytic species appearing on the rocky sides and bottom of the stream and on spray-dashed rocks at waterfalls: *Chiloscyphus rivularis*,

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[5] Fink, Bruce. Hermann Edward Hasse—Lichenist. Mycologia **8:** 243–248. Sept., 1916.

[6] Plitt, Charles C. Dr. Hermann Edward Hasse. BRYOLOGIST **19:** 30–33. March, 1916.

[7] BRYOLOGIST **19:** 49–50. May, 1916.

[8] Nichols, George E. The Vegetation of Connecticut. Bull. Torr. Bot. Club **43:** 235–264. May, 1916.

Scapania undulata, *Porella pinnata*, *Fontinalis dalecarlica*, *F. gigantea*, *F. Lescurii*, *Oxyrrhynchium rusciforme*, *Amblystegium fluviatile*, *A. irriguum*, *Hygrohypnum dilatatum*, *H. eugyrium*, and *H. ochraceum*.

(*b*) On periodically inundated rock surfaces: *Fissidens incurvus*, *Grimmia apocarpa*, *Racomitrium aciculare*, and *Brachythecium plumosum*.

(*c*) Along with "*b*" but usually on springy banks, or on continuously moist rock surfaces, where they may or may not be submerged during floods: *Conocephalum conicum*, *Pellia epiphylla*, *Plagiochila asplenioides*, *Lophocolea bidentata*, *Jubula pennsylvanica*, *Anthoceros laevis*, *Fissidens adiantoides*, *Mnium hornum*, *M. punctatum*, *Philonotis fontana*, *Thuidium delicatulum*, *Brachythecium rivulare*, *Climacium americanum*, and *Catharinaea undulata*.

(*d*) Wet or moist overhanging cliffs and precipitous cliffs higher up: *Marsupella emarginata*,. *Plagiochila asplenioides*, *Scapania nemorosa*, *Radula complanata*, *Lejeunea cavifolia*, *Hymenostylium curvirostre*, *Didymodon rubellus*, *Anoectangium Mougeotii*, *Plagiopus Oederi*, *Plagiothecium denticulatum*, *Hylocomium brevirostre*, and *Thamnium allegheniense*.

(*g*) On crevices or rock faces of drier cliffs: *Metzgeria conjugata*, *Cephaloziella Hampeana*, *Porella platyphylloidea*, *Leucolejeunea clypeata*, *Frullania Asagrayana*, *Rhabdoweisia denticulata*, *Grimmia conferta*, *Ulota americana*, *Bartramia pomiformis*, *Hedwigia albicans*, *Neckera pennata*, *Haplohymenium triste*, *Anomodon attenuatus*, and *A. rostratus*.

Nichols notes that "Owing to their frequently intimate association with rock surfaces, no group of plants, with the possible exception of the lichens, is better qualified to demonstrate the influence of the chemical composition of the substratum on vegetation than the bryophytes." He notes that in Connecticut this influence is largely that of calcareous as against potassic rocks and gives in that connection the following lists:

Species favoring calcareous rocks (mostly on marble, some on trap): *Grimaldia fragrans*, *Preissia quadrata*, *Pellia Fabroniana*, *Lophozia badensis*, *Lophocolea minor*, *Cololejeunea Biddlecomiae*, *Frullania riparia*, *Saelania glaucescens*, *Fissidens cristatus*, *Cratoneuron filicinum*, *Hymenostylium curvirostre*, *Tortella tortuosa*, *Encalypta contorta*, *Mnium orthorrhynchum*, *Plagiopus Oederi*, *Myurella julacea*, *Amblystegiella confervoides*, and *Amblystegium noterophilum*.

Mostly restricted to potassic rocks (i. e. "lime-avoiding"): *Marsupella emarginata*, *Sphenolobus exsectus*, *Scapania nemorosa*, *S. undulata*, *Radula obconica*, *Andreaea petrophila*, *A. Rothii*, *Rhabdoweisia denticulata*, *Dicranum fulvum*, *Glyphomitrium incurvum*, *Racomitrium aciculare*, *Ulota americana*, *Pterigynandrum filiforme*, *Brachythecium plumosum*, *Sematophyllum carolinianum*, *Hygrohypnum dilatatum*, and *H. eugyrium*.

Farther on in the article Nichols discusses the boreal aspect of the vegetation in rock ravines, noting that locally rare Canadian plants such as *Lophozia alpestris*, *L. attenuata*, *Gymnostomum rupestre*, and *Polytrichum alpinum* have been collected only in rock ravines. Further he notes that of the bryophytic flora in the forests of these ravines "the mossy carpet of *Bazzania trilobata*, *Hylocomium splendens*, *Ptilium Crista-castrensis*, and *Hypnum Schreberi* which frequently covers the forest floor—likewise is strongly suggestive of the north."

In comparison with the bryophytic flora of the ravines in the Pittsburgh region[9] the reviewer is forcibly struck by the lack of correspondence in the characteristic mosses of the two regions, very few of the mosses emphasized by Nichols being important, or even present at all, in the sandstone and shale ravines of the Pittsburgh region. While no experts on the hepatics have worked in the Pittsburgh ravines, it can probably be definitely stated that there is here no such hepatic vegetation as is listed by Nichols for Connecticut, his lists of characteristic species being about two-fifths hepatics. His description of the boreal carpet recalls very vividly to the writer the bryophytic carpet in the spruce forests on the islands of northwestern Lake Superior and the islands and surrounding hills of the Lake Nipigon region in northwestern Ontario.

O. E. J.

EXCHANGE DEPARTMENT

Offerings—*To members only.* Return postage should accompany the request.

Mr. Roy Latham, Orient, N. Y.—*Biatora rubella* (Ehrh.) Rabenh., and *Physcia obscura* (Ehrh.) Nyl. var. *endochrysea* Nyl.

Mr. C. C. Plitt, 3933 Lowndes Ave., Baltimore, Md.—*Cetraria islandica* (L.) Ach., collected in Maryland.

Mr. Severin Rapp, Sanford, Florida.—*Calicium trachylinum* Ach., and *Ricciella Sullivantii* (Aust.) Evans.

Mrs. Frank E. Lowe, 24 Brattle St., Worcester, Mass.—*Grimmia leucophaea* Grev., from Oklahoma.

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[9] Jennings, O. E. Systematic and Ecological Notes on the Mosses of Western Pennsylvania. BRYOLOGIST **18:** 83–93. Nov. 1915.